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BOOK OF ABSTRACTS

CHEMICAL DEFENSES IN MELON (Cucumis melo L.) LEAVES AGAINST THE LEAFMINER FLY (Liriomyza sativae): INTEGRATING VOLATILES, SEMI-VOLATILES, AND WAX CONSTITUENTS

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The leafminer fly (Liriomyza sativae) is the main pest affecting melons in Brazil, leading to significant drops in fruit quality and higher production costs. Due to the limited success of chemical control methods and the risk of developing insecticide resistance, resistant cultivars are considered a sustainable alternative. In this context, analyzing metabolites related to both innate and induced defenses is a promising strategy to identify chemical resistance markers that can be used in breeding programs. The study examined two contrasting pairs: A3.8 (resistant) × G1.S (susceptible), which are nearly genetically identical and ideal for metabolomic comparison, and AC13 (resistant) × GLD (susceptible), which are genetically different and represent real-world agricultural conditions. The genotypes were assessed at T0 (before infestation) and T2 (three days after infestation and mine appearance) using volatile analysis (SPME-GC-MS) and semi-volatile analysis (GC-MS of derivatized extracts from the apolar fraction). At T0, the susceptible genotypes (G1.S, GLD) showed accumulation of apocarotenoids (ionones, ciclocitral, oxoisophorone) and structural lipids (steroids, tocopherol, phytol, fatty acids), while the resistant ones (A3.8, AC13) had higher levels of leaf wax components, including n-alkanes, alcohols, and long-chain fatty acids. These results suggest a physical-chemical barrier present at the baseline level, indicating that antixenosis is not related to basal volatiles but may be partially linked to the leaf cuticle. At T2, the infested resistant genotypes exhibited a similar defensive profile, characterized by increased levels of GLVs (E-2-hexenal, hexanal), monoterpenes (limonene, isopinocarveol), and ketones (2-methyl-3-heptanone), indicating a rapid and coordinated defense response consistent with defense priming. In contrast, the susceptible genotypes maintained high levels of steroids, tocopherol, phytol, and fatty acids, indicating that membrane damage and oxidative stress were caused by larval mining. It can be concluded that A3.8 and AC13 share a chemical resistance pattern involving constitutive leaf wax barriers and the induction of GLVs and monoterpenes in response to attack, whereas G1.S and GLD exhibit vulnerability profiles. These metabolites are promising candidates as biomarkers of resistance in melon.

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